AGRICULTURAL EDUCATION IN MISSOURI

Agriculture and the food, fiber and natural resource system is America's most creative, productive and basic industry. Much of this country's success in agriculture can be attributed to a sound program of education. To advance a dynamic and efficient agriculture, food & natural resource system and to assure the continued well-being of our society, first-rate education must continue to be a high priority. A cooperative effort among educational institutions, government agencies and food, fiber and natural resource-related businesses will help Missouri provide leadership for the future through enhanced education.

Developments shaping food, fiber and natural resource systems

Participants representative of the food, fiber and natural resource industry were asked to identify the most important trends and developments over the next 30 years that will shape the future of agriculture and the food, fiber and natural resource systems. Five trends emerged as most important.

⇒ ***Accelerating globalization of markets.***

- Economic globalization with increasing population and falling trade barriers is taking us toward a more competitive international marketplace for agricultural products in which more countries will produce more kinds of foods and market them on an international scale.

⇒ ***Growing public demands for environmental protection and safe foods.***

- As production increases worldwide, pressures will grow everywhere to protect prime farmland from urban sprawl, conserve soil, safeguard water quality and fisheries, use water more efficiently, protect remaining wildlife habitats, and ensure a safe and healthy food supply.

⇒ ***Increasing reliance on technology.***

- Advances in computers, communications, information, biotechnology and other areas of technology will greatly affect education, agriculture and the operation of the food, fiber and natural resource systems.

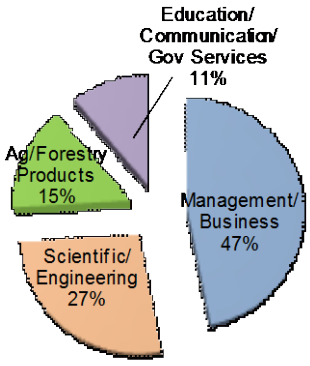
⇒ ***Decline public understanding of Agriculture, Food, Fiber and Natural Resource Systems.***

- The general population is increasingly cut off from both direct experience and education related to Agriculture, which has serious repercussions in terms of ill-informed consumer behavior, public opinion, regulation and political decision-making.

⇒ ***A more highly trained and diverse workforce.***

- A more diverse, highly trained workforce will be needed to manage the development of food, fiber and natural resource systems so that they will be competitive in the global marketplace and successful in an industry whose structure is changing.

FORECAST FOR CAREER OPPORTUNIES THROUGH 2015
(USDA, 2010)



About Agricultural Education

Agricultural education is a systematic program of instruction available to students desiring to learn about the science, business, and technology of plant and animal production and/or about the environmental and natural resources systems. Agricultural education first became a part of the public education system in 1917 when the U.S. Congress passed the Smith-Hughes Act. Today, over 900,000 students participate in formal agricultural education instructional programs offered in grades seven-adult throughout the 50 states and three U.S. territories.

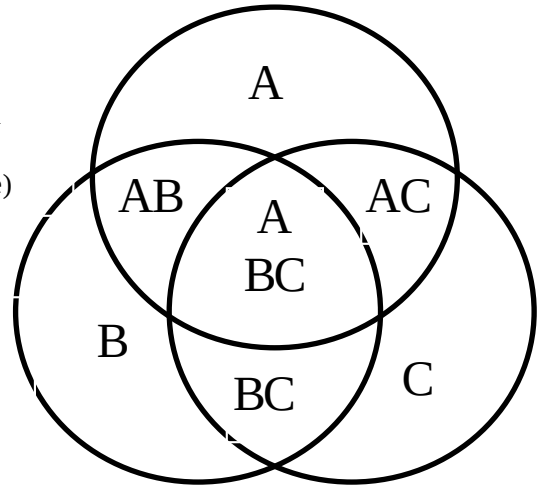
> ***Ag Ed Vision**: Agricultural education envisions a world where all people value and understand the vital role of agriculture and natural resources in advancing personal and global well-being.*
>
> ***Ag Ed Mission:** Agricultural education prepares students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber, and natural resources systems.*

Agricultural Education Delivery Systems

Agricultural Education - prepares secondary, postsecondary and adult students for a variety of careers and advanced college or technical training in the Agriculture, Food and Natural Resources System. Career opportunities for students range from positions in agribusiness, food science, agricultural mechanics and technology, plant science and horticulture, animal science, and natural resources conservation. Programs of study are delivered by the following: four-year "cluster" programs at comprehensive high schools and area career centers; two-year community college "specific" programs; and "supplemental" and "specific" adult education in high schools, area career centers and community colleges. At each level, training programs consist of three interrelated components:

A. Classroom Instruction (Knowledge)

B. Supervised Agricultural Experience (Skills)



C. Leadership Development (Attitude)

A. Classroom/laboratory instruction using the "problem-solving" technique.

B. Supervised agricultural experience in which each student gains "hands-on" experience outside the classroom.

C. Leadership development through the FFA in high school, PAS at the postsecondary institutions, and Young Farmers for adults currently employed in agriculture.

Missouri Agriculture Enrollment Trends

The following table shows total enrollment in secondary, postsecondary and adult agriculture programs. High school agriculture enrollment has increased steadily since 1985 and is currently at an all time high. This reverses a trend of declining enrollment that began in 1977. Factors which contribute to the increasing enrollment have not been formally studied, but teachers and others indicate they believe that: 1) the economic improvement of agriculture affects attitudes of parents, students and counselors toward enrolling; and 2) agriculture programs have expanded content and increased flexibility. Postsecondary enrollment has also increased in response to a changing agriculture and the public attitude about the future of agriculture. Adult enrollment has fluctuated since reaching a peak enrollment in 1985-86.

Total Student Enrollment

Year	No. of Programs	Secondary	Junior High	Postsecondary	Adult**
2014-2015	339	28,664	12,874	1,735	1,729
2013-2014	334	27,701	13,167	2,439	2,465
2012-2013	331	26,724	12,125	2,521	2,026
2011-2012	327	26,564	12,274	1,890	1,288
2010-2011	326	26,813	12,471	1,909	1,537
2009-2010	324	26,455	11,963	3,295	1,802
2008-2009	316	26,473	11,245	1,008	3,037
2007-2008	311	26,254	10,732	1,158	3,110
2006-2007	305	25,452	10,429	779	3,585
2005-2006	302	25,180	11,452	317	2,841
2004-2005	301	25,162	10,798	2,246	4,264
2003-2004	294	23,827	9,611	797	2,630
2002-2003	291	22,953	9,850	2,756	2,637
2001-2002	286	21,800	9,835	3,102	2,373
2000-2001	284	21,174	9,850	661	2,308
1999-2000	277	21,196	7,665	702	3,181
1998-1999	266	20,616	7,146	842	3,068
1997-1998	266	20,294	7,620	672	2,906
1996-1997	263	20,169	7,678	672	3,340
1995-1996	258	19,048	6,717	653	2,594
1994-1995	253	18,205	5,571	681	3,076
1993-1994	249	17,441	4,545	680	2,704
1992-1993	247	16,652	4,428	602	3,007
1991-1992	245	15,132	4,071	477	3,650
1990-1991	245	13,920	2,950	405	4,190
1989-1990	244	13,993		371	3,803
1988-1989	243	13,705		471	3,721
1987-1988	244	13,555		408	3,852
1986-1987	244	13,443		517	5,743
1985-1986	245	12,865		649	6,243
1984-1985	245	13,325		613	5,224

* Data from 12 institutions offering postsecondary agriculture.

** Adult programs are operated as a part of local programs.

Secondary Agricultural Education in the Public Schools

Agricultural education has been a part of the public education system throughout the history of our country. When the Latin grammar schools gave way to the academies of the late 1700s, agricultural courses were sometimes included in the curriculum. While these were general theoretical courses, many states made them a requirement for graduation. With the passage of the Smith-Hughes Act of 1917, many general agriculture courses were replaced with a course called "vocational agriculture." This change from a general to a vocational focus was not well accepted by certain groups, and therefore the new courses were not included in all public school curricula. The goal of the vocational agriculture program was "to prepare young people for employment in farming." After the National FFA Organization was founded in 1928 and became an

integral part of vocational agriculture, the total program was adopted by many public schools. Over the years, the program has changed to meet the needs of society and the work force. For example, the number of farmers has declined from 13.8% of the work force in 1947 to less than 2% in 2012. It is now estimated that agriculture/agribusiness provides 23% of all U.S. jobs. The Vocational Act of 1963 encouraged expansion of the vocational agriculture program to include training for entry into other agricultural occupations besides farming.

Enrollment in high school agriculture in Missouri is 28,664 students. Currently, 296 comprehensive high schools and 43 area vocational schools offer agriculture. Of the students enrolled, over 41% are female. There are 460 agriculture teachers in secondary schools. In 2014-2015, the program was offered in 74% of Missouri's public school districts maintaining high schools, and approximately 10% of the high school students were enrolled.

High School agriculture is a four-year program. A student normally earns four to six credits. The following table shows course offerings and enrollments for the past nine years.

Course Offerings and Enrollments/Number of Schools

Courses	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
Agricultural Science I	302	305	258	288	298	287	306	313	310
Agricultural Science II	272	262	230	271	265	255	268	275	**277**
Agricultural Management/Economics	99	89	84	93	93	76	81	66	80
Animal Science	137	132	118	138	143	127	141	158	157
Crop Science	32	38	27	40	37	32	33	33	38
Agricultural Sales & Marketing	97	83	72	89	88	71	81	83	88
Agricultural Power I	68	62	67	75	73	63	67	75	74
Agricultural Power II	19	16	14	12	16	13	14	15	18
Agricultural Machinery	38	33	29	40	40	31	31	32	38
Agricultural Structures	129	105	114	116	135	114	125	122	133
Agricultural Construction	282	223	197	225	232	211	226	227	218
Floriculture	61	49	47	56	55	43	46	49	55
Greenhouse Operation/Management	169	142	139	159	161	143	160	174	174
Nursery Operation & Management	18	16	21	17	22	13	12	26	21
Turf Management	9	15	12	13	14	12	11	15	8
Landscaping	97	98	72	86	88	73	78	70	65
Conservation Natural Resources	101	111	97	122	124	104	116	118	114
Forest Management	15	21	22	22	24	20	23	24	26
Supervised Occup. Exp. In Ag (Co-op)	73	71	82	71	100	84	90	81	73
Agricultural Other	58	46	6	7	7	4	1	0	0
Agricultural Literacy	186	186	208						
Food Science & Tech	40	30	34	43	40	41	46	56	54
Agricultural Communications		31	56	52	67	69	77	94	89
Biotechnology		2	7	9	10	7	8	10	7
Equine Science		6	11	11	12	12	12	10	8
Veterinary Science		3	20	12	21	17	16	22	32

Number of Students Enrolled

Courses	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
Agricultural Science I	9990	10891	10636	10918	11741	10588	9437	9774	9818
Agricultural Science II	5506	5787	5528	6320	6177	5689	5436	5212	5357
Agricultural Management/Economics	1201	1186	1101	1050	1188	833	619	660	591
Animal Science	2492	2452	1928	2544	2313	1883	1770	1945	1925
Crop Science	363	557	312	469	392	480	452	405	607
Agricultural Sales & Marketing	1098	885	756	963	903	701	676	684	680
Agricultural Power I	1083	1089	906	1242	1008	877	925	880	852
Agricultural Power II	209	148	136	133	146	171	172	150	142
Agricultural Machinery	534	564	462	740	615	512	493	595	498
Agricultural Structures	1917	1709	1836	1698	2192	1683	1537	1447	1605
Agricultural Construction	3872	3936	3795	4228	4785	3232	2564	2716	2761
Floriculture	694	697	736	803	860	718	539	597	560
Greenhouse Operation/Management	2507	2232	2544	2671	2709	2205	2311	2198	2379
Nursery Operation & Management	280	239	287	308	288	141	160	276	236
Turf Management	132	210	181	160	190	124	174	157	147
Landscaping	1353	1430	1060	1416	1329	883	748	648	703
Conservation Natural Resources	1453	1867	1623	2088	1929	1459	1595	1389	1291
Forest Management	197	308	312	313	333	285	258	297	316
Supervised Occup. Exp. In Ag (Co-op)	640	666	1067	755	1280	643	426	458	507
Agricultural Other	1050	916	85	58	119	35			
Agricultural Literacy	11452	11452	12471						
Food Science & Tech	432	363	511	469	619	571	576	623	614
Agricultural Communications		377	666	596	711	604	715	734	748
Biotechnology		24	57	99	162	88	132	156	154
Equine Science		82	170	179	185	151	178	128	189
Veterinary Science		113	271	164	277	177	347	308	432

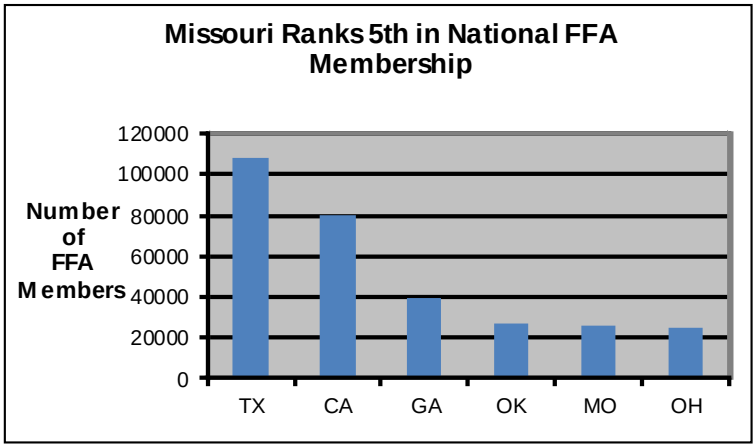
Student Career Interest

All students enrolled in agriculture programs are asked to identify an agricultural interest in one of six Agricultural Career Cluster areas. The following percentages reflect student choices in 2013-14.

	% of Total	With-in Cluster Pathway	
Agricultural Business/Management Systems	15%	Males-49%	Females-51%
Agricultural Mechanics & Technology	30%	Males-92%	Females- 8%
Animal Science Systems	29%	Males-33%	Females-67%
Food Science Systems	5%	Males-39%	Females-61%
Natural Resources/Conservation Systems	12%	Males-74%	Females-26%
Plant Science/Horticultural System	9%	Males-40%	Females-60%

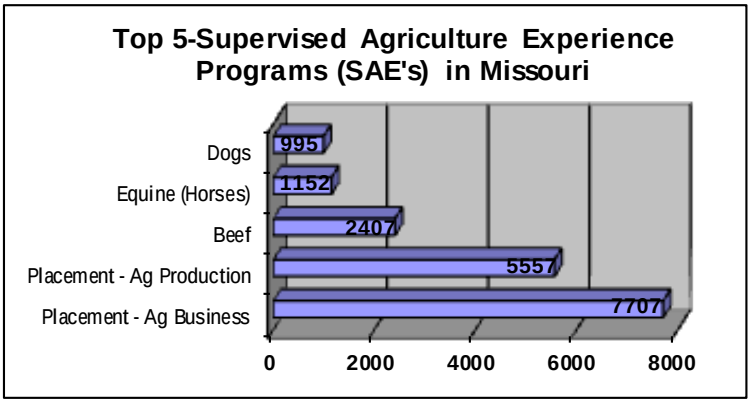
FFA Membership

FFA activities are designed to teach leadership and promote personal skill development. Students can become involved at the area, district, state and national levels in various ways. Each agriculture program in Missouri has a chartered FFA chapter. The 2014-15 membership in the Missouri FFA was 25,779.



Supervised Agricultural Experience

Each student is counseled to select courses and Supervised Agricultural Experience Program (SAEP) activities that relate to their agricultural interest.



Of the 77% of students who completed SAE programs in 2015, 36% had ownership projects and 64% had placement projects (working for someone in an agribusiness or on a farm). The average SAEP net income per student for 2015 was $2,756. Statewide, over $47,824,750 net income was generated through SAE programs.

Year	Avg Net Income Per Student	State-wide Net Income
2014	$2,756	$47,824,750
2013	$2,443	$45,093,218
2012	$2,430	$44,217,043
2011	$2,452	$42,396,418
2010	$2,275	$38,655,177
2009	$2,287	$42,067,470
2008	$2,570	$46,758,851
2007	$2,483	$45,596,348

These were the types of projects chosen by students in 2014-15.

Ownership Projects

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Horses	1645	1537	1552	1600	1497	1488	1457	1570	1439	1152
Dogs	1063	1199	1208	1268	1166	1231	1200	1345	1231	995
Rabbits	351	612	339	386	346	378	392	448	446	444
Goats	334	401	469	643	499	505	544	571	528	518
Fish	32	51	35	39	50	47	35	37	36	17
Bees	35	18	17	22	25	33	22	31	42	60
Poultry	611	604	647	715	701	796	883	979	1002	993
Sheep	407	391	399	420	372	352	340	390	365	351
Swine	848	906	1014	973	844	878	876	903	822	963
Dairy	185	198	209	177	244	182	184	189	145	134
Beef	2982	3086	2972	2916	2713	2696	2786	2904	2647	2407
Agribusiness	827	1043	801	903	942	1172	1040	1067	1126	1118
Custom Work	317	318	438	320	376	445	566	495	427	450
Vegetables	375	410	439	478	315	425	401	425	415	422
Plants	426	379	425	437	449	318	249	431	343	274
Berries/Grapes	37	50	54	40	49	39	38	44	45	56
Trees/Wood lot	112	92	106	168	136	135	120	133	133	139
Sunflowers	3	3	7	1	2	4	2	4	4	10
Tobacco	5	5	11	28	6	2	1	0	3	2
Forages/Hay	215	224	271	210	216	207	171	244	237	186
Rice	3	3	6	5	4	3	4	5	2	1
Cotton	3	3	7	8	6	6	7	7	7	6
Soybeans	236	212	254	251	233	252	245	302	282	221
Milo	21	19	17	19	12	6	7	9	8	15
Corn	215	179	202	195	209	247	189	233	213	190
Wheat	106	91	109	105	91	64	69	109	82	73

Placement Projects

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Agribusiness	10463	8958	9233	11862	9021	8131	8806	8264	7874	7707
Production	4575	5256	5083	5308	5136	5011	5796	5746	5470	5557
Laboratory (usually school site)	1391	1303	1139	1169	1117	1120	1293	1330	1502	1535

Graduate Placement

In 2014, there were 5,370 high school agricultural education graduates. Of this number 94.9 % were placed.

26% are employed
- 20% in agriculture
- 6% in other areas

64% are continuing their education
- 41% in agriculture
- 23% in other areas

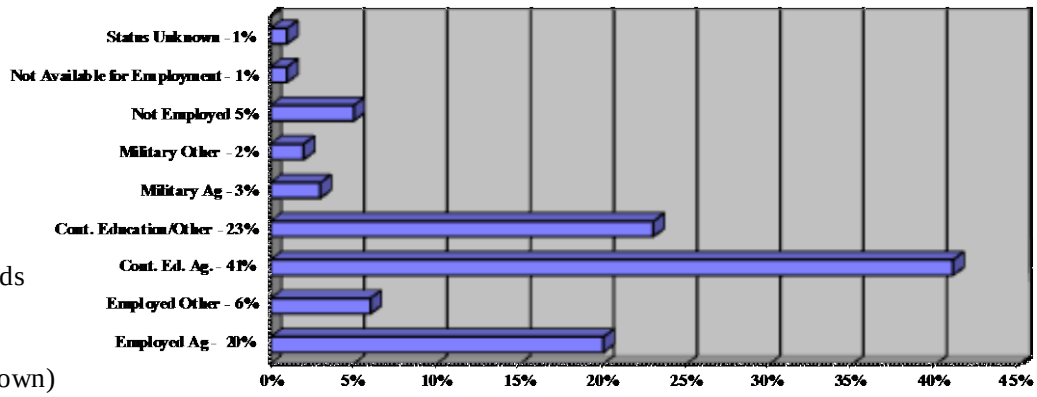
5% are in the military
- 3% in agriculture related fields
- 2% in non agriculture related fields

5% are not employed

<1% are not available for employment

<1% could not be found (status unknown)

Of the total, 64% are pursuing agriculture as a career.



Postsecondary Agricultural Education

Eleven community colleges and one state technical college in Missouri staffed with 16 instructors currently offer postsecondary-level training in agriculture. During 2013-2014, these 12 institutions served 2,439 students in 8 career programs:

- ⇒ Agricultural Production/Farm Management
- ⇒ Animal Health Technology
- ⇒ Agricultural Business
- ⇒ Agricultural Equipment
- ⇒ Agricultural Power and Machinery
- ⇒ Horticulture
- ⇒ Landscape, Nursery and Turf Management
- ⇒ Biotechnology

The typical postsecondary student is a high school graduate who wants to train for a middle-management position and/or transfer to a baccalaureate institution. Postsecondary programs provide 64 credit hours of instruction in a two-year program for a full-time student. Programs include supervised occupational experience gained through internships and on-the-job training. Students are employed throughout Missouri and, in some cases, in other states. In most areas, students are paid for their services during the internship and also receive academic credit.

Of the 143 postsecondary/adult (2 year) agriculture graduates in 2014, 72% are placed.

65% are employed
- 50% in agriculture
- 15% in other areas

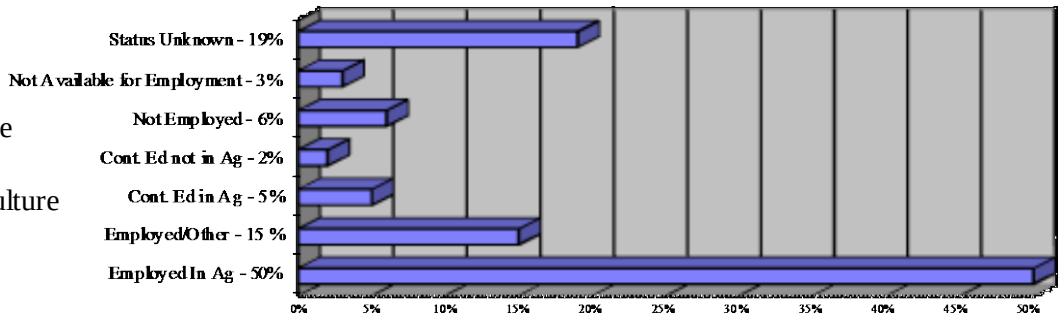
5% are continuing their education in agriculture

2% are continuing their education not in agriculture

6% are not employed

3% are not available for employment

19% could not be found (status unknown)



Of the total, 55% are pursuing agriculture as a career.

Leadership development is available through the Missouri and National Postsecondary Agricultural Student Organizations (PAS). The Missouri Postsecondary Agricultural Student Organization (MPASO) was established in 1981. Membership is open to any student enrolled in a postsecondary agriculture program. In Missouri, seven institutions have local PAS organizations. PAS members have the opportunity to participate in the state conference where contests are held, state officers are elected and the state business is conducted.

Adult Agriculture

Adult agriculture classes were organized soon after the Smith-Hughes Act was passed in 1917 and have been recognized as a part of agricultural education ever since. Several types of adult education have been offered through the years in Missouri.

"Topics" classes that highlight one-session meetings have long been, and still are, a viable part of adult education in agriculture. These classes tend to address current problems and issues, update enrollees with new technologies, and explore subjects of general interest to a fairly diverse audience. Currently, they are the most common type of adult class offered. "Topics" classes typically include 8 to 12 sessions and meet weekly, biweekly or monthly, primarily during the winter months.

"In-depth" classes are becoming a popular way of providing education to adults in agriculture. An "in-depth" class is a series of sessions on the same topic (for example, a two-to-eight session series in horticulture, marketing, forestry or ag mechanics). Because content is specialized, enrollment is sometimes lower. Traditionally, "topic" and "in-depth" classes are offered as a part of local programs, and instructors are paid an hourly rate based on instructional time.

The Farm Business Management Analysis (FBMA) program is a third type of adult education in agriculture. The program involves class work, on-site visitations and record analysis, all designed to improve the management of the farm business and to help farmers achieve their personal, financial and farm business goals.

A significant development in adult leadership training was the formation of the Missouri Young Farmers/ Young Farm Wives organization in 1972. This organization involves adults in educational and leadership activities at the local, district, state and national levels. Membership in the organization is open to persons of any age. State activities include a 2-day convention in February, a 2 1/2-day tour in August and participation in the Governor's Conference on Agriculture.

These facts and figures describe the status of adult agricultural education in Missouri:

- ⇒ 1,729 adults enrolled in DESE reimbursed agriculture classes in 2013-2014.
- ⇒ 25 schools received DESE reimbursement for adult classes in 2014-2015.
- ⇒ There were 27 active Young Farmers/Young Farm Wives chapters in 2014-2015. State membership totaled 770.
- ⇒ Agriculture instructors in 27 schools had part or all of their time scheduled for adult instruction in 2014-15 and over 137 farm families enrolled in the FBMA program.

The Development of Professional Teachers of Agriculture

Missouri law and the Department of Elementary and Secondary Education's regulations require all teachers and administrators in vocational education programs to be specifically certificated for their teaching assignments.

In 2015, Missouri had five institutions training agriculture teachers: University of Missouri-Columbia, Northwest Missouri State University at Maryville, Southeast Missouri State University at Cape Girardeau, Missouri State University at Springfield and College of the Ozarks, Point Lookout.

Pre-service programs alone cannot adequately prepare all teachers in all competencies. Therefore, professional development programs are designed and offered to assist the teachers in meeting their needs and the needs of their clientele. The program is jointly planned by teachers, teacher educators and state supervisors. A Professional Development Specialist manages the state-wide effort.

Agriculture as a Part of General Education

Agricultural education began in this country as a part of general education. Passage of the Smith-Hughes Act in 1917 promoted the concept of "vocational agriculture" as a separate program. The narrow focus of vocational agriculture was broadened somewhat through the Vocational Education Act of 1963, which encouraged training for non-farm agricultural occupations. Today, however, the basic differences between the "general" and "vocational" approaches remain.

Our society's basic knowledge of agriculture is declining. More and more people in agriculture-related jobs will know less and less about their industry. In addition, a growing number of young people who do not have a background in farming or agriculture are training for agriculture-related occupations. For example, 40-45% of the students now enrolled in the University of Missouri-Columbia's College of Agriculture are non-farm, urban students. Another important issue today is providing a vocational education for adults. Many adults, for example, are interested in studying agriculture--not for career purposes, but to meet a vocational, hobby or secondary-income objectives. Additionally, more public and social interest is being focused on issues related to agriculture, food and the environment. Such trends signal a need for students and citizens in general to be better informed about the importance of agriculture and its relationship to their lives. In other words, our American society needs to be agriculturally literate.

Several projects are now underway in Missouri to develop agricultural literacy by promoting public awareness and understanding of agriculture's role in our economy and society. At the junior high/middle school level, Agricultural Literacy courses were offered in 2014-2015 to 12,874 seventh and eighth grade students in 227 schools. Other examples of this effort are the "Agriculture in the Classroom" project, supported by Missouri Farm Bureau and the Ag Literacy projects by the Missouri Department of Agriculture and commodity organizations, which introduce young students to concepts about agriculture and food production.

Building public awareness and understanding about issues and trends affecting agriculture in our state and nation is vital to having an informed citizenry.